

# Práctica 1 SWAP

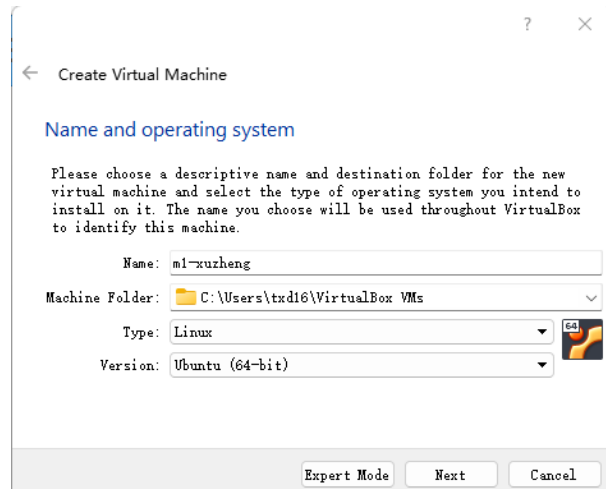
XuSheng Zheng

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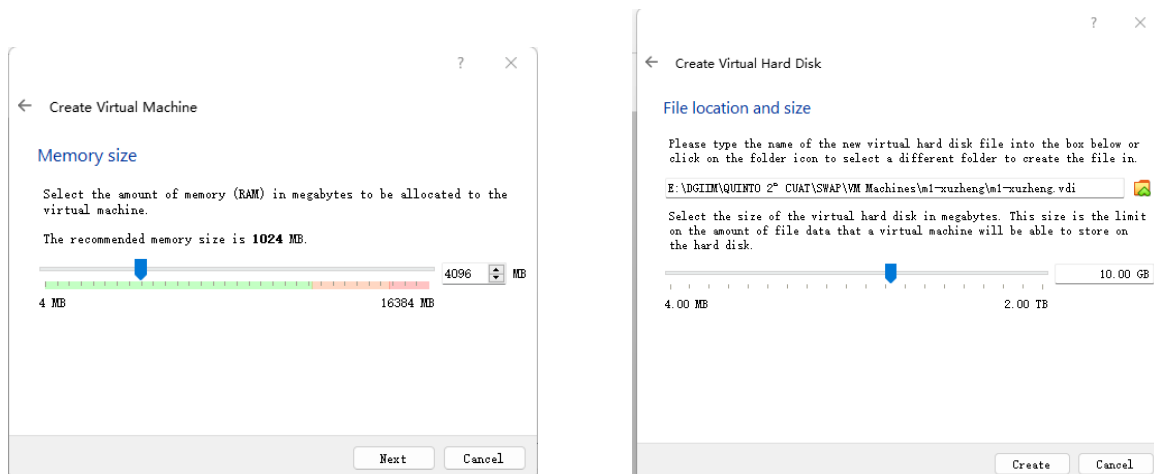
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### 1. Instalación de máquinas virtuales

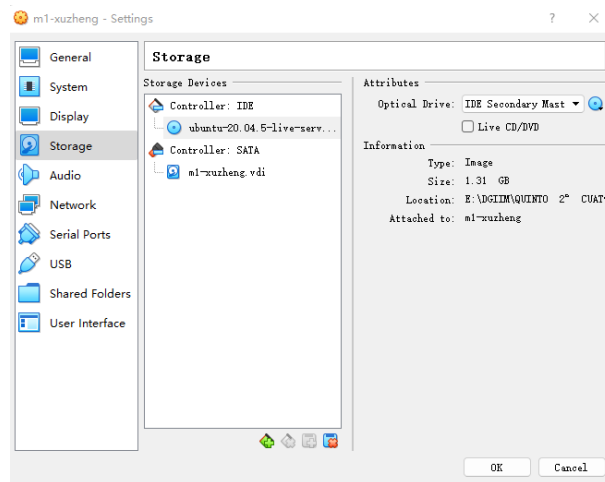
Comenzamos con la instalación de las máquinas virtuales. Puesto que vamos a hacer lo mismo en ambas máquinas, vamos a centrarnos en la configuración de una de ellas:



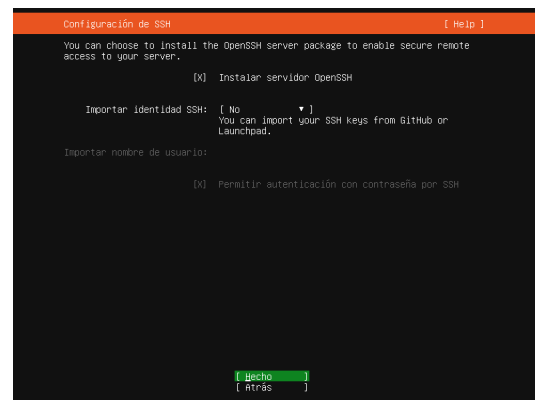
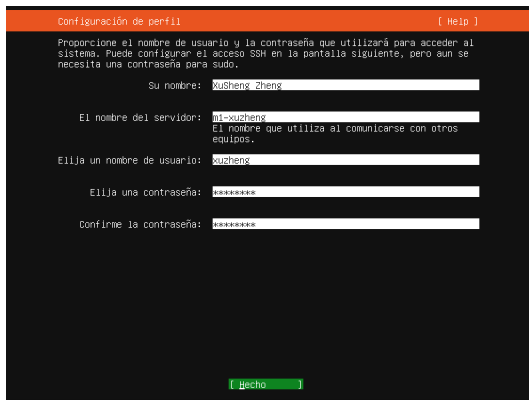
Le damos 4GB de RAM y 10 GB de disco duro:



Vamos a instalar Ubuntu Server, en este caso, será la 20.04:

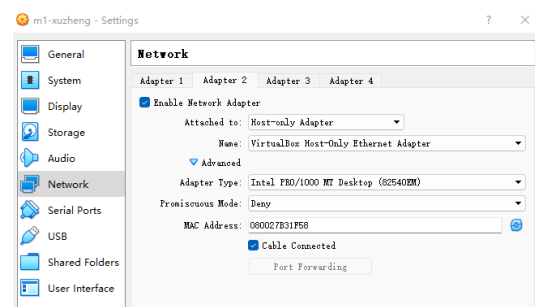
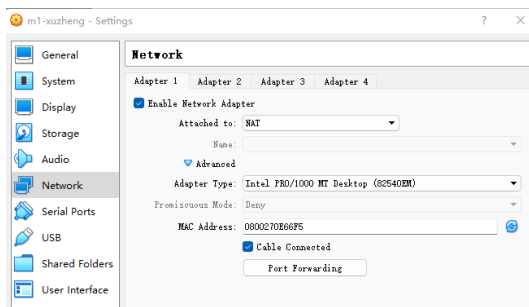


Arrancamos e introducimos nuestros datos dejando que nos instale SSH:



## 2. Configuración de red

Una vez instalado la máquina virtual, vamos a configurar la red para permitir la conexión con Internet y con el anfitrión. En primer lugar activamos los adaptadores NAT y solo-anfitrión:



Podemos usar el comando **ipconfig** en el anfitrión para ver la puerta de enlace (esta red ya estaba creada anteriormente por las prácticas de ISE):

```
Ethernet adapter VirtualBox Host-only Ethernet Adapter:
Connection-specific DNS Suffix . : 
Link-local IPv6 Address . . . . . : fe80::5102:65b5:c7bf:ab1c%7
IPv4 Address. . . . . : 192.168.56.1
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
```

## 2.1. Configuración de adaptadores mediante netplan

Configuramos la red con **netplan** editando el archivo `/etc/netplan/config.yaml`:

```
network:
  ethernets:
    enp0s3:
      dhcp4: true
    enp0s8:
      dhcp4: false
      addresses: [192.168.56.70/24]
  version: 2
```

Dejamos una interfaz que se configura mediante DHCP y otra con IP estática **192.168.56.70**. Aplicamos los cambios con **netplan apply** y comprobamos con **ifconfig**:

```
kuzheng@mi-kuzheng:~$ sudo netplan apply
kuzheng@mi-kuzheng:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::a00:27ff:fe0e:66f5 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:0e:66:f5 txqueuelen 1000 (Ethernet)
    RX packets 525 bytes 493819 (493.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 278 bytes 30565 (30.5 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.56.70 netmask 255.255.255.0 broadcast 192.168.56.255
    inet6 fe80::a00:27ff:feb3:1f58 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:b3:1f:58 txqueuelen 1000 (Ethernet)
    RX packets 1616 bytes 492635 (492.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 29 bytes 2306 (2.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 186 bytes 16614 (16.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 186 bytes 16614 (16.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

## 3. Instalación y configuración de Apache+PHP+MySQL

Sigamos con la configuración de la máquina virtual instalando Apache, PHP y MySQL:

```
kuzheng@m1-xuzheng:~$ sudo apt-get install apache2 mysql-client
[sudo] password for kuzheng:
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
Se instalarán los siguientes paquetes adicionales:
apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3
libaprutil1-ldap libcglib-fast-perl libcglib-pm-perl libencode-locale-perl libevent-core-2.1-7
libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl libhtml-tagset-perl
libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl libjansson4
liblua5.2-0 liblua-metatypes-perl libmecab2 libmime-date-perl liburi-perl mecab-ipadic
mecab-ipadic-utf8 mecab-utils mysql-client-8.0 mysql-client-core-8.0 mysql-common
mysql-server-8.0 mysql-server-core-8.0 ssl-cert
Pquetes sugeridos:
apache2-dbg apache2-suexec-pristine | apache2-suexec-custom www-browser libdata-dump-perl
libipc-sharedcache-perl libwww-perl mailx tinyca openssl-blacklist
Se instalarán los siguientes paquetes NUEVOS:
apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3
libaprutil1-ldap libcglib-fast-perl libcglib-pm-perl libencode-locale-perl libevent-core-2.1-7
libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl libhtml-tagset-perl
libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl libjansson4
liblua5.2-0 liblua-metatypes-perl libmecab2 libmime-date-perl liburi-perl mecab-ipadic
mecab-ipadic-utf8 mecab-utils mysql-client mysql-client-8.0 mysql-client-core-8.0 mysql-common
mysql-server mysql-server-8.0 mysql-server-core-8.0 ssl-cert
0 actualizados, 37 nuevos se instalarán, 0 para eliminar y 0 no actualizados.
Se necesita descargar 34,0 MB de archivos.
Se utilizarán 272 MB de espacio de disco adicional después de esta operación.
¿Desea continuar? [S/n] _
```

Una vez finalizada la instalación comprobamos:

```
kuzheng@m1-xuzheng:~$ apache2 -v
Server version: Apache/2.4.41 (Ubuntu)
Server built: 2023-01-23T18:36:09
kuzheng@m1-xuzheng:~$ ps aux | grep apache
kuzheng      3555  0.0  0.0  6432  656 tty1    S+   17:22   0:00 grep --color=auto apache
kuzheng@m1-xuzheng:~$ sudo service apache2 status
* apache2.service - The Apache HTTP Server
   loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   active: inactive (dead)
   Docs: https://httpd.apache.org/docs/2.4/
kuzheng@m1-xuzheng:~$
```

Podemos ver que el servidor está inactivo, lo activamos:

```
xuzheng@m1-xuzheng:~$ sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /lib/systemd/systemd-sysv-installer.
Executing: /lib/systemd/systemd-sysv-install enable apache2
xuzheng@m1-xuzheng:~$ sudo systemctl start apache2
xuzheng@m1-xuzheng:~$ sudo service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-03-08 17:25:42 UTC; 57s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3752 (apache2)
    Tasks: 55 (limit: 4610)
   Memory: 5.2M
   CGroup: /system.slice/apache2.service
           └─3752 /usr/sbin/apache2 -k start
             └─3760 /usr/sbin/apache2 -k start
               └─3761 /usr/sbin/apache2 -k start

mar 08 17:25:42 m1-xuzheng systemd[1]: Starting The Apache HTTP Server...
mar 08 17:25:42 m1-xuzheng apachectl[3740]: AH00558: apache2: Could not reliably determine the serv
mar 08 17:25:42 m1-xuzheng systemd[1]: Started The Apache HTTP Server.
lines 1-15/15 (END)
```

De mismo modo con MySQL:

```
xuzheng@mi-xuzheng:~$ sudo systemctl enable mysql
Synchronizing state of mysql.service with SysV service script with /lib/systemd/systemd-sysv-install
: Executing: /lib/systemd/systemd-sysv-install enable mysql
xuzheng@mi-xuzheng:~$ sudo systemctl start mysql
xuzheng@mi-xuzheng:~$ sudo systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/lib/systemd/system/mysql.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-03-08 17:27:43 UTC; 6s ago
     Process: 4105 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0/SUCCESS)
    Main PID: 4124 (mysqld)
      Status: "Server is operational"
        Tasks: 39 (limit: 4610)
       Memory: 362.7M
         CGroup: /system.slice/mysql.service
                └─4124 /usr/sbin/mysqld

mar 08 17:27:42 mi-xuzheng systemd[1]: Starting MySQL Community Server...
mar 08 17:27:43 mi-xuzheng systemd[1]: Started MySQL Community Server.
lines 1-13/13 (END)
```

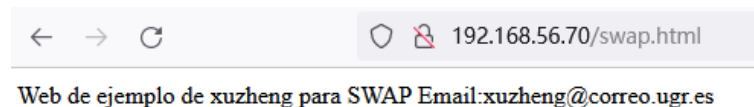
Para comprobar el funcionamiento de Apache creamos el archivo *swap.html* en el directorio */var/www/html/*:

```
<HTML>
<BODY>
Web de ejemplo de xuzheng para SWAP
Email:xuzheng@correo.ugr.es
</BODY>
</HTML>
```

En la versión de Ubuntu Server instalado, **cURL** ya está instalado de por defecto, podemos utilizarlo para acceder al archivo html creado anteriormente:

```
xuzheng@mi-xuzheng:/var/www/html$ cd ~
xuzheng@mi-xuzheng:~$ curl http://192.168.56.70/swap.html
<HTML>
<BODY>
Web de ejemplo de xuzheng para SWAP
Email:xuzheng@correo.ugr.es
</BODY>
</HTML>
xuzheng@mi-xuzheng:~$ _
```

También es posible acceder desde el anfitrión:



The screenshot shows a web browser window with the address bar displaying "192.168.56.70/swap.html". The page content is: "Web de ejemplo de xuzheng para SWAP Email:xuzheng@correo.ugr.es".

#### 3.1. Cambio de puerto

Para cambiar el puerto del servidor Apache modificamos los archivos */etc/apache2/ports.conf* y */etc/apache2/sites-enabled/000-default.conf*, en este caso, cambiamos de 80 a 8080:

```
# If you just change the port or add more ports here, you will likely also
# have to change the VirtualHost statement in
# /etc/apache2/sites-enabled/000-default.conf

#Listen 80
Listen 8080

<IfModule ssl_module>
    Listen 443
</IfModule>

<IfModule mod_gnutls.c>
    Listen 443
</IfModule>
```

```
<VirtualHost *:8080>
    # The ServerName directive sets the request scheme, hostname and port that
    # the server uses to identify itself. This is used when creating
    # redirection URLs. In the context of virtual hosts, the ServerName
    # specifies what hostname must appear in the request's Host: header to
    # match this virtual host. For the default virtual host (this file) this
    # value is not decisive as it is used as a last resort host regardless.
    # However, you must set it for any further virtual host explicitly.
    #ServerName www.example.com

    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/html

    # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
    # error, crit, alert, emerg.
    # It is also possible to configure the loglevel for particular
    # modules, e.g.:
    #LogLevel info ssl:warn

    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined

    # For most configuration files from conf-available/, which are
    # enabled or disabled at a global level, it is possible to
    # include a line for only one particular virtual host. For example the
    # following line enables the CGI configuration for this host only
    # after it has been globally disabled with "a2disconf".
    #include conf-available/serve-cgi-bin.conf
</VirtualHost>

# vim: syntax=apache ts=4 sw=4 sts=4 sr noet
```

Reiniciamos el servicio de Apache y comprobamos:

```
xuzheng@ml-xuzheng:~$ curl http://192.168.56.70/swap.html
curl: (7) Failed to connect to 192.168.56.70 port 80: Connection refused
xuzheng@ml-xuzheng:~$ curl http://192.168.56.70:8080/swap.html
<HTML>
<BODY>
Web de ejemplo de xuzheng para SWAP
Email:xuzheng@correo.ugr.es
</BODY>
</HTML>
xuzheng@ml-xuzheng:~$
```

## 3.2. Directorio virtual

Comenzamos creando un directorio `/var/www/ejemplo/public.html` y un archivo `index.html` sencillo:

```
<HTML>
<BODY>
Ejemplo de directorio virtual
</BODY>
</HTML>
```

Para evitar problemas de privilegios, ejecutamos **sudo chown -R www-data: /var/www/ejemplo**. Ahora necesitamos crear el archivo de configuración `/etc/apache2/sites-available/ejemplo.conf` como sigue:

```
<VirtualHost *:80>
    # The ServerName directive sets the request scheme, hostname and port that
    # the server uses to identify itself. This is used when creating
    # redirection URLs. In the context of virtual hosts, the ServerName
    # specifies what hostname must appear in the request's Host: header to
    # match this virtual host. For the default virtual host (this file) this
    # value is not decisive as it is used as a last resort host regardless.
    # However, you must set it for any further virtual host explicitly.
    #ServerName www.example.com

    ServerName ejemplo
    ServerAlias ejemplo

    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/ejemplo/public_html

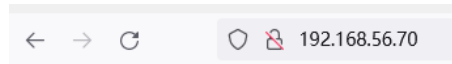
    # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
    # error, crit, alert, emerg.
    # It is also possible to configure the loglevel for particular
    # modules, e.g.:
    #LogLevel info ssl:warn

    <Directory /var/www/ejemplo/public_html>
        Options -Indexes +FollowSymLinks
        AllowOverride All
    </Directory>

    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined

    # For most configuration files from conf-available/, which are
    # enabled or disabled at a global level, it is possible to
    # include a line for only one particular virtual host. For example the
    # following line enables the CGI configuration for this host only
    # after it has been globally disabled with "a2disconf".
    #include conf-available/serve-cgi-bin.conf
```

Activamos el directorio virtual con **sudo a2ensite ejemplo**, volvemos a habilitar el puerto 80 en */etc/apache2/ports.conf* y reiniciamos Apache. Para comprobar podemos acceder desde el anfitrión:



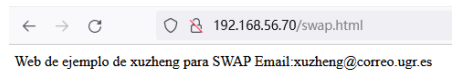
Ejemplo de directorio virtual

### 3.3. Redirección de puertos

Vamos redirigir el puerto 80 del directorio virtual al puerto 8080, para ello añadimos a */etc/apache2/sites-available/ejemplo.conf* las siguientes líneas:

```
ProxyPreserveHost On
ProxyRequests Off
ProxyPass / http://localhost:8080/
ProxyPassReverse / http://localhost:8080/
```

Además, tenemos que ejecutar **sudo a2enmod proxy && sudo a2enmod proxy\_http** para activar módulos necesarios y reiniciamos Apache. Para comprobarlo, accedemos desde el anfitrión:



## 4. Instalación y configuración de cURL

Como habíamos mencionado anteriormente, **cURL** ya está instalado. Podemos comprobarlo con **curl --version**:

```
kuzheng@ml-xuzheng:~$ curl --version
curl 7.68.0 (x86_64-pc-linux-gnu) libcurl/7.68.0 OpenSSL/1.1.1.f zlib/1.2.11 brotli/1.0.7 libidn2/2.2.0
libpsl/0.21.0 (+libidn2/2.2.0) libssh/0.9.3/openssl/zlib nghttp2/1.40.0 librtmp/2.3
Release-Date: 2020-01-08
Protocols: dict file ftp gopher http https imap imaps ldap ldaps pop3 pop3s rtmp rtsp scp sftp
smbs smtp smtps telnet tftp
Features: AsynchDNS brotli GSS-API HTTP2 HTTPS-proxy IDN IPv6 Kerberos Largefile libz NTLM_NGHTTP2
SPNEGO SSL TLS-SRP UnixSockets
```

Podemos usarlo con argumento **-o** indicando el nombre del archivo que deseamos que se guarde o con argumento **-O** para descargar con el nombre original:

```
kuzheng@ml-xuzheng:~$ curl -o imagen.png https://www.google.es/images/srpr/logo3w.png
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
100 6748 100 6748 0 0 44688 0 --:--:-- --:--:-- --:--:-- 44688
kuzheng@ml-xuzheng:~$ ls
imagen.png
kuzheng@ml-xuzheng:~$ curl -O https://www.google.es/images/srpr/logo3w.png
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
100 6748 100 6748 0 0 69567 0 --:--:-- --:--:-- --:--:-- 69567
kuzheng@ml-xuzheng:~$ ls
imagen.png logo3w.png
kuzheng@ml-xuzheng:~$
```

### 4.1. Peticiones Get/Post

Por defecto, las peticiones que realizan **cURL** son de tipo GET, pero podemos usar cualquier método de petición mediante el argumento **-X** indicando el tipo. Como ejemplo vamos a realizar una petición POST al correo institucional:



```
xuzheng@mi-xuzheng:~$ curl -X POST https://webmailtest.ugr.es -H "Content-Type:application/json" -d
{"username":"user", "password":"pass"}_
```

## 4.2. Cookies

cURL permite descargar cookies de sitios web mediante el argumento **-c**. También permite el envío de los mismos mediante el argumento **-b**:

```
xuzheng@mi-xuzheng:~$ curl -c cookies.txt https://www.google.com/
```

```
xuzheng@mi-xuzheng:~$ cat cookies.txt
# Netscape HTTP Cookie File
# https://curl.haxx.se/docs/http-cookies.html
# This file was generated by libcurl! Edit at your own risk.

.google.com TRUE / TRUE 1741619733 CONSENT PENDING+837
__HttpOnly__google.com TRUE / TRUE 1712734431 __Secure-ENID 10.SE=jmID_1uGNLhg-
KQwda_-tall&HwvJt0IXBpICRLPNK2IVCSjWPhOUVvC3uZt8PwEicXBumdhWz254v1zRlIov2Fnx&gt1fzv-3JUn5-
7X2x2pIvMdhTqJrIr9yVtW6H0jHkYndeshw6fLR2w-dome4IQ6so
__HttpOnly__google.com TRUE / TRUE 1694099733 AEC ARSKqsI669IEVh2OE08skLU08A2
KXDSqutwPz0fRe_Vs&dox0f-11u
.google.com TRUE / TRUE 1712675733 SOCS CAAaBgIAla-gBg
xuzheng@mi-xuzheng:~$ curl -b cookies.txt https://www.google.com/
(HTTP/2.0) 200 OK https://www.google.com/
<TITLE>302 Moved</TITLE></HEAD><BODY>
<H1>302 Moved</H1>
The document has moved
<A HREF="https://consent.google.com/ml?continue=https://www.google.com/&pgi=ES&pgi=mc&pgi=pc&pgi=
&pgi=uxnone&pgi=es&pgi=srcl">here</A>
</BODY></HTML>
```

## 5. Configuración de SSH

Recordemos que ya habíamos instalado SSH, para ver que funciona correctamente vamos a intentar conectar ambas máquinas:

```
xuzheng@mi-xuzheng:~$ ssh xuzheng@192.168.56.71
xuzheng@192.168.56.71's password:
Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0-144-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System Information as of sáb 11 mar 2023 15:39:48 UTC

System load:  0.0          Processes:    122
Usage of /:   40.6% of 8.02GB Users logged in:    1
Memory usage: 14%         IPv4 address for enp0s3: 10.0.2.15
Swap usage:   0%          IPv4 address for enp0s8: 192.168.56.71

25 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Sat Mar 11 15:39:35 2023 from 192.168.56.70
xuzheng@mi-xuzheng:~$ exit
logout
Connection to 192.168.56.71 closed.
xuzheng@mi-xuzheng:~$ _
```

```
xuzheng@m2-xuzheng:~$ ssh xuzheng@192.168.56.70
xuzheng@192.168.56.70's password:
Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0-144-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System Information as of sáb 11 mar 2023 15:41:01 UTC

System load:  0.04         Processes:    128
Usage of /:   40.6% of 8.02GB Users logged in:    1
Memory usage: 14%         IPv4 address for enp0s3: 10.0.2.15
Swap usage:   0%          IPv4 address for enp0s8: 192.168.56.70

25 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Sat Mar 11 15:40:52 2023 from 192.168.56.71
xuzheng@mi-xuzheng:~$ exit
logout
Connection to 192.168.56.70 closed.
xuzheng@m2-xuzheng:~$
```

### 5.1. Cambio de puerto

Para cambiar el puerto donde se conecta SSH, necesitamos configurar el archivo `/etc/ssh/sshd_config`. En este caso, usaremos el puerto 2222 en ambas máquinas:

```
# $OpenBSD: sshd_config,v 1.103 2018/04/09 20:41:22 tj Exp $
# This is the sshd server system-wide configuration file. See
# sshd_config(5) for more information.
# This sshd was compiled with PATH=/usr/bin:/bin:/usr/sbin:/sbin
# The strategy used for options in the default sshd_config shipped with
# OpenSSH is to specify options with their default value where
# possible, but leave them commented. Uncommented options override the
# default value.

Include /etc/ssh/sshd_config.d/*.conf

Port 2222
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

#HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_ecdsa_key
#HostKey /etc/ssh/ssh_host_ed25519_key

# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
#LogLevel INFO

# Authentication:

#LoginGraceTime 2m
#PermitRootLogin prohibit-password
#StrictModes yes
#MaxAuthTries 6
```

Después de guardar los cambios tenemos que reiniciar el servicio SSH. Una vez reiniciado, para conectarnos hace falta especificar el puerto mediante el argumento **-p**:

```
xuzheng@m1-xuzheng:~$ ssh xuzheng@192.168.56.71
ssh: connect to host 192.168.56.71 port 22: Connection refused
xuzheng@m1-xuzheng:~$ ssh -p 2222 xuzheng@192.168.56.71
xuzheng@192.168.56.71's password:
Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0-144-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of sáb 11 mar 2023 15:55:05 UTC

System load: 0.0          Processes: 121
Usage of /:  40.6% of 8.02GB Users logged in: 1
Memory usage: 14%         IPv4 address for enp0s3: 10.0.2.15
Swap usage:  0%           IPv4 address for enp0s8: 192.168.56.71

25 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Sat Mar 11 15:39:49 2023 from 192.168.56.70
xuzheng@m2-xuzheng:~$ exit
logout
Connection to 192.168.56.71 closed.
xuzheng@m1-xuzheng:~$ _
```

## 5.2. Conexión sin contraseña

En primer lugar, necesitamos generar el par de claves pública y privada. Lo hacemos con el comando **ssh-keygen** dejando los campos vacíos como sigue:

```
xuzheng@m1-xuzheng:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/xuzheng/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/xuzheng/.ssh/id_rsa
Your public key has been saved in /home/xuzheng/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:QUg8ZSd5oKxhzCmFWEO/dWk3+kbJ7jby0nKiQfX+LEV xuzheng@m1-xuzheng
The key's randomart image is:
+--[RSA 3072]-----+
  o.o=.o.
  ++.*..
  ..O.*
  .B.O
  o.=S.
  .Eo+.
  ..+.
  .oBoB
  |..O++*
+-----[SHA256]-----+
xuzheng@m1-xuzheng:~$
```

Una vez creadas en ambas máquinas copiamos la clave pública a la máquina contraria:

```
xuzheng@m1-xuzheng:~$ ssh-copy-id -p 2222 xuzheng@192.168.56.71
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: '/home/xuzheng/.ssh/id_rsa.pub'
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are alr
eady installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- If you are prompted now it is to inst
all the new keys
xuzheng@192.168.56.71's password:
Number of key(s) added: 1
Now try logging into the machine, with: "ssh -p '2222' 'xuzheng@192.168.56.71'"
and check to make sure that only the key(s) you wanted were added.
xuzheng@m1-xuzheng:~$
```

```
xuzheng@m2-xuzheng:~$ ssh-copy-id -p 2222 xuzheng@192.168.56.70
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: '/home/xuzheng/.ssh/id_rsa.pub'
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are alr
eady installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- If you are prompted now it is to inst
all the new keys
xuzheng@192.168.56.70's password:
Number of key(s) added: 1
Now try logging into the machine, with: "ssh -p '2222' 'xuzheng@192.168.56.70'"
and check to make sure that only the key(s) you wanted were added.
xuzheng@m2-xuzheng:~$
```

Ahora al intentar conectar ya no nos pide la contraseña:

```
xuzheng@m1-xuzheng:~$ ssh -p 2222 xuzheng@192.168.56.71
Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0-144-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of sáb 11 mar 2023 16:14:51 UTC

System load: 0.02      Processes:      121
Usage of /:  40.7% of 8.02GB   Users logged in: 1
Memory usage: 14%      IPv4 address for enp0s3: 10.0.2.15
Swap usage: 0%         IPv4 address for enp0s8: 192.168.56.71

25 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Sat Mar 11 16:14:20 2023 from 192.168.56.70
xuzheng@m2-xuzheng:~$ exit
logout
Connection to 192.168.56.71 closed.
```

```
xuzheng@m2-xuzheng:~$ ssh -p 2222 xuzheng@192.168.56.70
Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0-144-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of sáb 11 mar 2023 16:15:01 UTC

System load: 0.03      Processes:      122
Usage of /:  40.6% of 8.02GB   Users logged in: 1
Memory usage: 14%      IPv4 address for enp0s3: 10.0.2.15
Swap usage: 0%         IPv4 address for enp0s8: 192.168.56.70

25 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Sat Mar 11 15:55:57 2023 from 192.168.56.71
xuzheng@m1-xuzheng:~$ exit
logout
Connection to 192.168.56.70 closed.
```

## 6. Bibliografía

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